We claim:

1. A method of etching films comprising:

(a) loading a substrate having an exposed layer into an etch reactor having deposits formed therein during an etch process conducted on another substrate;

(b) conducting another etch process on the loaded substrate that removes said exposed layer and said deposits; and

(c) conducting said an etch process on the loaded substrate.

2. The method according to claim 1 wherein said an etch process is a plasma etch process.

3. The method according to claim 1 wherein said another etch process is a plasma etch process.

4. The method according to claim 2 wherein said exposed compatible layer comprises silicon nitride.

5. The method according to claim 2 wherein said an etch process is a trench etch process.

6. The method according to claim 2 wherein said an etch process removes a portion of the substrate.

7. The method according to claim 6 wherein said removed portion of said substrate forms a trench.

8. A method of etching a trench in a silicon substrate and cleaning a reactor comprising:

(a) loading a silicon substrate into an etch reactor having deposits from another silicon substrate formed therein, said substrate having at least one layer of material formed thereon;

(b) conducting a first etch operation that removes a portion of said at least one layer

of material and the deposits; and

(c) conducting a second etch operation that removes a portion of said silicon substrate and forms deposits in said etch reactor.

9. The method of claim 8 wherein said at least one layer of material comprises silicon nitride.

10. A method according to claim 8 wherein the gas composition of said first etch operation comprises a fluorine containing compound and a bromine containing compound.

11. A method according to claim 10 wherein said fluorine containing compound is SF_6.

12. A method according to claim 10 wherein said bromine containing compound is HBr.

13. A method according to claim 8 wherein said removed portion of said silicon substrate forms a trench having an aspect ratio of about or greater than 20:1.

14. A method according to claim 8 wherein said removed portion of said silicon substrate forms a trench having a diameter of between about 0.1μm and 0.3μm.

15. A method according to claim 8 wherein said second etch operation uses a source gas comprising a halogen containing compound and oxygen.

16. A method according to claim 15 wherein said halogen containing compound is HBr.

17. A method according to claim 8 wherein said second etch operation uses a plasma source gas comprising a fluorine containing compound and oxygen to remove a portion of the silicon substrate near the surface of said substrate.

18. A method according to claim 8 wherein said second etch operation uses a source gas

which includes at least three reactive gases which include at least one fluorine-containing compound which does not contain silicon, at least one silicon-containing compound and oxygen.

19. A method according to claim 18 wherein the volumetric ratio of said at least one fluorine-containing compound which does not contain silicon to said at least one silicon-containing compound ranges from about 100:1 to about 1:10.

20. A method according to claim 18 wherein said second etch operation uses an etch source gas which includes at least three reactive gases which include at least one fluorine-containing compound which does not contain silicon, at least one silicon-containing compound and oxygen to form a portion of a deep trench furthest from the surface of the substrate.

21. A method according to claim 18 wherein said silicon-containing compound is selected from the group consisting of SiF_4, Si_2F_6, $SiHF_3$, SiH_2F_2, SiH_3F, Si_2OF_6, $SiCl_2F_2$, $SiClF_3$, and combinations thereof.

22. A method according to claim 18 wherein said silicon-containing compound does not contain fluorine and is selected from the group consisting of $SiBr_4$, $SiHBr_3$, SiH_2Br_2, SiH_3Br, $SiCl_4$, $SiHCl_3$, SiH_2Cl_2, SiH_3Cl, Si_2Cl_6, SiH_4, Si_2H_6, Si_3H_8, Si_4H_{10}, $SiHI_2$, SiH_2I, $C_4H_{12}Si$, $Si(C_2H_3O_2)_4$, and combinations thereof.

23. A method according to claim 18 wherein said fluorine-containing compound which does not contain silicon is selected from the group consisting of F_2O, F_2O_2, NF_3, NOF, NO_2F, SF_6, SF_4, S_2F_2, S_2F_{10}, CF_4, CH_2F_2, CHF_3, CH_3F, and combinations thereof.

24. A method for plasma etching a trench in a silicon substrate comprising:

(a) placing a first silicon substrate into a plasma etch processing chamber having deposits formed within said chamber from plasma etch processes conducted on a substrate prior to said first substrate, said first silicon substrate having a plurality of film layers

comprising a patterning mask oxide layer, a hard mask layer and a pad oxide layer wherein said pad oxide layer is adjacent to said substrate and said hard mask layer is disposed between said pad oxide layer and said patterning mask oxide layer and a portion of said patterning mask oxide layer has been removed to expose a portion of said hard mask layer;

(b) conducting a plasma etch process within said processing chamber that exposes a portion of the silicon substrate and removes the deposits formed from the plasma etch processes conducted on a substrate prior to said first substrate;

(c) conducting a plasma etch process that removes a portion of the first silicon substrate and forms deposits within said processing chamber;

(d) removing said first silicon substrate from said processing chamber; and

(e) without performing a cleaning operation, loading into said plasma etch processing chamber a second silicon substrate having a plurality of film layers comprising a patterning mask oxide layer, a hard mask layer and a pad oxide layer wherein said pad oxide layer is adjacent to said substrate and said hard mask layer is disposed between said pad oxide layer and said patterning mask oxide layer and a portion of said patterning mask oxide layer has been removed to expose a portion of said hard mask layer.

25. A method according to claim 24 wherein said plasma etch process conducted to expose a portion of the silicon substrate utilizes a plasma source gas comprising a fluorine containing compound and bromine containing compound.

26. A method according to claim 25 wherein said fluorine containing compound is SF_6.

27. A method according to claim 25 wherein said bromine containing compound is HBr.

28. A method according to claim 24 wherein said plasma etch process that removes a portion of the first silicon substrate and forms deposits within said processing chamber uses a plasma source gas which includes at least three reactive gases which include at least one fluorine-containing compound which does not contain silicon, at least one silicon-containing compound and oxygen.

29. A method according to claim 28 wherein said silicon-containing compound is selected from the group consisting of SiF_4, Si_2F_6, $SiHF_3$, SiH_2F_2, SiH_3F, Si_2OF_6, $SiCl_2F_2$, $SiClF_3$, and combinations thereof.

30. A method according to claim 28 wherein said silicon-containing compound does not contain fluorine and is selected from the group consisting of $SiBr_4$, $SiHBr_3$, SiH_2Br_2, SiH_3Br, $SiCl_4$, $SiHCl_3$, SiH_2Cl_2, SiH_3Cl, Si_2Cl_6, SiH_4, Si_2H_6, Si_3H_8, Si_4H_{10}, $SiHI_2$, SiH_2I, $C_4H_{12}Si$, $Si(C_2H_3O_2)_4$, and combinations thereof.

31. A method according to claim 28 wherein said fluorine-containing compound which does not contain silicon is selected from the group consisting of F_2O, F_2O_2, NF_3, NOF, NO_2F, SF_6, SF_4, S_2F_2, S_2F_{10}, CF_4, CH_2F_2, CHF_3, CH_3F, and combinations thereof.

32. A method according to claim 24 wherein said step of conducting a plasma etch process that removes a portion of the first silicon substrate is used to remove a portion of a deep trench that is furthest from the surface of the substrate.

33. A method of etching substrates comprising:

(a) loading a substrate having at least two layers formed thereon into a first etch reactor and conducting an etch process to remove a portion of said at least two layers to expose a portion of a layer;

(b) loading said substrate having a portion of a layer exposed into a second etch reactor, said second reactor having deposits formed therein from another substrate;

(c) conducting a first etch process in said second etch reactor on said substrate having a portion of a layer exposed that removes a portion of said exposed layer and said deposits;

(d) conducting a second etch process in said second etch reactor that removes a portion of the silicon substrate and forms deposits inside said second etch reactor; and

(e) without removing said deposits formed by said second etch operation, loading into said second etch reactor a second substrate having a portion of a layer exposed.

34. A method according to claim 33 wherein substrates processed within said first etch reactor are transferred to said second etch reactor under vacuum.

35. A method according to claim 33 wherein said first reactor is a magnetically enhanced reactive ion etch reactor and said second reactor is a high density plasma etch reactor.

36. A computer readable storage medium having program code embodied therein, said program code for controlling a semiconductor wafer processing system, wherein said semiconductor processing system includes a chamber having deposits formed therein, a power supply, and a gas supply wherein said program code controls the semiconductor processing system to process a wafer having a layer of material thereon in the chamber in accordance with the following:

(a) flowing a first gaseous composition from said gas supply into said chamber;

(b) providing energy to said chamber to form a plasma from said first gaseous composition introduced into said chamber to remove said layer of material on said substrate and said deposits;

(c) flowing a second gaseous composition from said gas supply into said chamber; and

(d) providing energy to said chamber to form a plasma of said second gaseous composition to remove a portion of the substrate and form deposits in said processing chamber.

37. An apparatus for processing a semiconductor wafer in a processing chamber, said chamber having deposits formed therein, comprising:

a gas panel coupled to said processing chamber;

an antenna proximate to said processing chamber

a power supply coupled to said antenna; and

a controller, coupled to said antenna and said gas panel, said controller containing a computer readable storage medium having program code embodied therein, said program code for controlling the apparatus in accordance with the following:

(a) loading into the processing chamber a substrate having a material deposited thereon;

(b) flowing from the gas panel to the processing chamber a first gaseous composition;

(c) controlling said power supply to provide energy to said antenna thereby providing energy to said chamber to form a first plasma from said first gaseous composition introduced into said chamber so that said first plasma removes said layer formed on said substrate and said deposits;

(d) flowing from the gas panel to the processing chamber a second gaseous composition; and

(e) controlling said power supply to provide energy to said antenna thereby providing energy to said chamber to form a second plasma from said second gaseous composition introduced into said chamber so that said second plasma removes a portion of said substrate and forms deposits in said processing chamber.